

## REMARKS/ARGUMENTS

Applicants acknowledge receipt of the Office Action dated January 28, 2009.

### **Status of the Claims:**

Claims 1, 14, 37, 51, and 66 are currently amended.

Claims 5, 7, 17, and 78-111 are canceled without prejudice. Applicants retain the right to pursue the subject matter of these claims at a later time, for example, via a continuing application.

As such, claims 1-4, 6, 8-16, 18-77, and 112-119 are pending in this application.

Claims 1, 14, 37, 51, 66, and 112 are independent claims from which the rest of the pending claims depend. Applicants believe all pending claims are allowable over the art of record and respectfully request reconsideration and allowance of all claims.

### **Claim Rejections Under 35 U.S.C. §103(a)**

In the Office Action, the Examiner alleges that claims 1-4, 6-16, 18-77, and 112-119 are unpatentable over US Patent No. 4,404,124 (hereinafter Johnson '124) taken together with US Patent No. 6,576,588 (hereinafter Ryu '588). In light of the claim amendments presented above, Applicants respectfully traverse the rejections.

Applicants acknowledge that the Examiner maintains the position that the combination of the applied references, Johnson '124 and Ryu '588, is proper. Applicants submit the following facts and respectfully request that the Examiner furnish evidence sufficient to establish a *prima facie* case for the obviousness rejections, stated on page 3 of the Office Action.

- **Fact 1:** Johnson '124 teaches "a catalyst for the selective hydrogenation of acetylene consisting essentially of particles of alpha alumina containing metallic components consisting essentially of palladium and silver" (abstract, column 2 lines 21-23, column 2 lines 13-16, Example I, column 6 lines 1-5, and claims 1, 3, 4, 5, 8-9, for example).
- **Fact 2:** Ryu '588 teaches "a catalyst for selective hydrogenation of acetylenes comprising a copper component and a member selected from the group consisting of at least one Group VIII metal component, a Ag component, a Au component and mixtures thereof"

(abstract, column 2 lines 51-65, column 3 lines 2-15, column 4 lines 6-9, column 4 lines 21-34, column 4 line 66 – column 5 line 3, Example 12, and claims 1-6 and 10- 17, for examples). Ryu '588 also teaches that the catalyst may further comprise “a Zn component” (claims 7 and 18, for example), and may further comprise “Ni, Cr, Co or mixtures thereof” (claims 9 and 21, for example).

- **Fact 3:** Ryu '588 teaches that “[b]y alloying copper with palladium, the chemical nature of the copper-palladium catalyst is changed from the traditional palladium or palladium-silver catalysts” (column 4 lines 21-24). By comparing Example 12 with Control Example 3, Ryu '588 concludes that “[i]t was unexpected that the palladium promoted copper catalyst has several times higher activity than the traditional Pd catalyst” (column 17 lines 47-49), which is contrary to the general knowledge that “[c]opper catalysts selectively hydrogenate acetylenic compounds without substantial hydrogenation of the olefins and diolefins (designated herein as selectivity for retaining olefins), but have relatively low activity and short cycle time” whereas “[p]alladium catalysts have excellent activity and much longer cycle time, but lower selectivity for the acetylenes than copper-based catalysts”, also taught by Ryu '588 (column 1, lines 18-28).

- **Fact 4:** According to amended claim 1 of the instant application, the claimed hydrogenation catalyst consists “essentially of: a precursor comprising at least one Group VIII metal disposed on an inorganic support; and a second metal selected from the group consisting of zinc, Group IIIA metals, Group VIIB metals, and combinations thereof”.

Based on the facts presented above, Applicants submit the following chart as a visual aid to clarify why it would not have been reasonable or logical for one of ordinary skill in the art to combine Johnson '124 and Ryu '588. The following chart is to be used only as an example and is not to be considered to limit the claim scope of the instant application in any way.

### CHART: Metallic Components of Catalysts

<u>Application</u>	<u>Johnson '124</u>
Group VIII metal + Zn	Pd + Ag
Group VIII metal + Group IIIA metal(s)	
Group VIII metal + Group VIIB metal(s)	<u>Ryu '588</u>
Group VIII metal + Combinations of Zn, Group IIIA metal(s), and Group VIIB metal(s)	Cu + Group VIII metal
	Cu + Ag
	Cu + Au
	Cu + Group VIII metal + Ag
	Cu + Group VIII metal + Au
	Cu + Au + Ag
	Cu + Group VIII metal + Au + Ag
	Further comprising * Zn
	Further comprising * Ni, Cr, Co, or mixtures

\*: "Further comprising" means that an additional component is included besides the metallic combinations listed above. For example, Zn is further included in Ag promoted Cu catalysts; Ni is further is further included in Ag-Au promoted Cu catalysts.

(1) Based on the teachings of Ryu '588, copper (Cu) is not only an essential component for the catalyst disclosed in Ryu '588, it is the base metal upon which copper catalysts are modified. One of ordinary skill in the art would have understood that modifications for copper catalysts are not commutable to modifications for palladium catalysts because their catalytic

chemistry fundamentally differs from one another, as evidenced by “Fact 3” presented above that their catalytic activities produce results that differ in nature. Even though Johnson ‘124 and Ryu ‘588 both relate to hydrogenation catalysts, one who understands the teachings of both references will acknowledge that they deal with catalysts of two completely different categories. If one were to use a promoter metal as disclosed in Ryu ‘588 to modify a palladium catalyst as disclosed in Johnson ‘124, he would have no reasonable expectation of success and would inevitably find himself in a trial-and-error situation to discover a useful combination of metallic components for a hydrogenation catalyst. Indeed, an undue amount of experimentation would have been necessarily required if one of ordinary skill in the art were to combine Johnson ‘124 and Ryu ‘588 in an attempt to discover a useful metal combination that would result in a catalyst, wherein its nature and level of activity are yet to be studied. It is well known and commonly acknowledged by those skilled in the art that the catalytic arts are inherently unpredictable. In such cases:

Consider the predictability of the technology. *See, e.g., Dillon*, 919 F.2d at 692-97, 16 USPQ2d at 1901-05; *In re Grabiak*, 769 F.2d 729, 732-33, 226 USPQ 870, 872 (Fed. Cir. 1985). If the technology is unpredictable, it is less likely that structurally similar species will render a claimed species obvious because it may not be reasonable to infer that they would share similar properties. *See, e.g., In re May*, 574 F.2d 1082, 1094, 197 USPQ 601, 611 (CCPA 1978) (prima facie obviousness of claimed analgesic compound based on structurally similar prior art isomer was rebutted with evidence demonstrating that analgesia and addiction properties could not be reliably predicted on the basis of chemical structure); *In re Schechter*, 205 F.2d 185, 191, 98 USPQ 144, 150 (CCPA 1953) (unpredictability in the insecticide field, with homologs, isomers and analogs of known effective insecticides having proven ineffective as insecticides, was considered as a factor weighing against a conclusion of obviousness of the claimed compounds).

MPEP 2144.08 (2008). Furthermore, the unpredictability of catalytic arts is evidenced by Ryu ‘588 at column 17 lines 47-49 that “[i]t was unexpected that the palladium promoted copper catalyst has several times higher activity than the traditional Pd catalyst”, which is contrary to the general knowledge concerning copper catalysts and palladium catalysts (see, for example, “Fact 3” presented above). Therefore, one of ordinary skill in the art could not have reasonably expected to obtain a hydrogenation catalyst simply by combining a metal component from a Pd-based catalyst and a second metal component from a Cu-based catalyst as alleged by the Examiner.

(2) Furthermore, Ryu ‘588 emphatically teaches (see, for example, “Fact 3” presented above) that the unexpected performance of the modified copper catalysts is due to the change in

the chemical nature of the copper-palladium catalyst from the traditional palladium or palladium-silver catalysts, which results in a promoted copper catalyst that has several times higher activity than the traditional Pd catalyst. Clearly, under such guidance from Ryu '588, one of ordinary skill in the art would be discouraged from forsaking the copper component of the catalyst since the combination of Cu and Pd resulted in an alloy that exhibited exceptional and unexpected catalytic activities. Therefore, it would not have been either reasonable or logical for one of ordinary skill in the art to combine Johnson '124 and Ryu '588.

(3) If the Examiner insists that the combination of Johnson '124 and Ryu '588 would lead to the claimed catalyst of the instant application, Applicants respectfully request that evidence be provided as to (1) why one of ordinary skill in the art would have had a reasonable expectation of success for the alleged combination and (2) why one of ordinary skill in the art would completely forsake the copper component of Ryu '588 while the presence of copper is so essential and desirable for higher catalytic activity and selectivity, according to the art.

In light of the above arguments that apply to independent claims 1, 14, 37, 51, 66, and 112, Applicants respectfully submit that the Examiner has not established a valid foundation for rejection under 35 U.S.C. §103(a).

Claim 1 is an independent claim from which claims 2-4, 6, and 8-13 depend; claim 14 is an independent claim from which claims 15-16 and 18-36 depend; claim 37 is an independent claim from which claims 38-50 depend; claim 51 is an independent claim from which claims 52-65 depend; claim 66 is an independent claim from which claims 67-77 depend; and claim 112 is an independent claim from which claims 113-119 depend.

Accordingly, it is respectfully requested that the 35 U.S.C. §103(a) rejections to claims 1-4, 6, 8-16, 18-77, and 112-119 be removed, and the claims allowed.

#### **Other Remarks**

Applicants would like to bring to the Examiner's attention that no composition of the claimed catalysts of the instant application is taught or suggested by Johnson '124 or Ryu '588.

On page 3 of the Office Action, the Examiner suggests that Ryu '588 teaches "Group III metal or In, Ga, etc.". Applicants respectfully request that the Examiner point out specifically where in Ryu '588 these metal components are taught.

### **CONCLUSION**

Applicants respectfully request reconsideration and allowance of the pending claims and a timely Notice of Allowance be issued in this case. If the Examiner feels that a telephone conference would expedite the resolution of this case, the Examiner is respectfully requested to contact the undersigned.

In the course of the foregoing discussions, Applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may be other distinctions between the claims and the prior art that have yet to be raised, but which may be raised in the future.

If any fees are inadvertently omitted or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to Conley Rose, P.C. Deposit Account Number 03-2769.

Respectfully submitted,

/Timothy S. Westby/  
Timothy S. Westby  
Reg. No. 52,352  
CONLEY ROSE, P.C.  
P.O. Box 3267  
Houston, Texas 77253-3267  
(713) 238-8000  
ATTORNEY FOR APPLICANTS